Appendix 6A

Number of Items Identified in WES HAZOPS

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The HAZOP review for each of the five pump stations and the El Paso Terminal was conducted by a team of five to eight engineers and technicians familiar with the particular site being reviewed. The areas of the project studied were subdivided into workable-sized segments called "nodes." As part of the HAZOP review, possible causes and consequences of potential hazards and operability problems were noted as well as improvements or action strategies that would reduce or prevent the circumstance. The following elements were addressed in the HAZOP:

- The hazards and operability problems of the process;
- The identification of any previous incident that had a likely potential for catastrophic consequences;
- Engineering and administrative controls applicable to the hazards and their interrelationships;
- Evaluation of possible safety and health effects due to failure of engineering and administrative controls;
- Facility siting – inclusion of facility characteristics;
- Human factors – operator-to-process/equipment interface and work schedules; and
- A qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the workplace.

The study team used the information contained in the latest piping and instrumentation drawings (P&ID) for each individual pump station. A simple risk matrix was used to classify recommendations into ten risk categories. The WES HAZOP teams classified the items identified for improvements as either hazard or operability items, with further sub-classification as high, medium, or low priorities. Table 6A-1 in Appendix 6A summarizes how the hazard or operability items were classified for each station. The high- and medium-hazard issues were identified at only two locations: the El Paso Terminal and the Satsuma Pump Station. These issues are summarized in Table 6A-2.

Table 6A-1. Number of Hazard or Operational Items for Follow-up Identified from WES Pump Station HAZOPs

	Hazard			Operational			
Station	**High**	**Medium**	**Low**	**High**	**Medium**	**Low**	**Total**
Galena Park	0	0	0	0	0	0	0
Satsuma	0	1	0	0	0	1	2
Kimble	0	0	2	0	0	2	4
Cedar Valley	0	0	2	0	0	2	4
Crane	0	0	2	0	0	1	3
El Paso	1	3	1	0	0	3	10

Table 6A-2. Summary of High- and Medium-Hazard Issues Identified during Longhorn HAZOP Study of Existing Pump Stations

Pump Station	Hazard Level	Potential Hazard	Possible Consequence	Identified Action
El Paso	High	Thermal expansion of liquid in blocked-in piping for valves 336 and 339 on unloading skid and piping to ethanol storage tank No. 18	Potential for overpressure from effect of hot ambient temperatures on blocked in liquid product	Consider installing thermal relief valves (TSVs) on piping to protect ethanol unloading skid piping
	Medium	Pipe rupture due to high flow from Mainline Pump No. 1	Possible fire, explosion, personnel exposure, environmental damage, remediation	• Consider adding high-flow shutdown. • Consider discussing El Paso Terminal Emergency Action Plan for mainline pumps with Chevron's Operations Control personnel
	Medium	Pipe rupture due to high flow from Mainline Pump No. 2	Possible fire, explosion, personnel exposure, environmental damage, remediation	• Consider adding high-flow shutdown. • Consider discussing emergency Action Plan for mainline pumps with Santa Fe's Kinder-Morgan's) Operations Control personnel
	Medium	Pipe rupture due to high flow from Mainline Pump No. 3	Possible fire, explosion, personnel exposure, environmental damage, remediation	Consider adding high-flow shutdown
Satsuma	Medium	MOV-3, PSV-1, or valve 16 closed (on surge relief tank and piping)	Possible overpressure surge of 20-inch line, potentially causing rupture of piping components	Consider changing valve 16 from ANSI 150 psi valve to ANSI 300 series valve